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had disappeared, the plants themselves were mostly overturned by the winter's alternate freezings and thawings, and had I not known the exact spot, I would have had great difficulty in finding the moss. The following summer the banks unfortunately fell in, and in consequence our rarity disappeared.—G. N. Best.

## THE PERISTOME—I.

By A. J. GROUT.

The peristome, besides being one of the most beautiful of microscopic objects, is also one of the parts most carefully considered in classifying mosses. The details of the differences in development and structure of the various types of peristomes have never been presented in English in a popular form. M. Philibert in the *Revue Bryologique* has given a masterly presentation of the subject, but it is in French, and too extended and technical to be of popular interest.

This series of articles will be based largely on the work of Schimper and Philibert, but will in no sense be a translation of either. Free use will be made of Schimper's illustrations published in his various works, and these will be supplemented by original drawings.

THE simplest type of peristome is that of *Georgia* (*Tetraphis*), where the tissue which fills the operculum splits into four equal parts, as is shown in the accompanying figure. The operculum is composed of a single layer of cells, and is easily deciduous.

It is an interesting fact that in *Andreaea* and *Georgia*, which have a thalloid protonema indicating a close relationship to the hepatics, the capsule divides into four parts. In *Andreaea* the whole capsule dehisces as in the hepatics; in *Georgia*, only that portion of the tissue lying within the operculum. Prof. D. H. Campbell in his *Structure and Development of the Mosses and Ferns*, states that he considers this resemblance an accident. I am not so sure that this is the case. If he be right, the division of these capsules into four parts, and the division of all moss peristomes into multiples of four, may possibly be explained by the regularity of the divisions of the two-sided apical cell from which the sporophyte is developed. It will readily be seen that in *Georgia* no spores are found within the operculum. This is true of mosses having any other type of peristome. In all other types, the central tissue forms the columella, which in most cases shrinks up into a small piece of tissue upon the falling of the operculum.

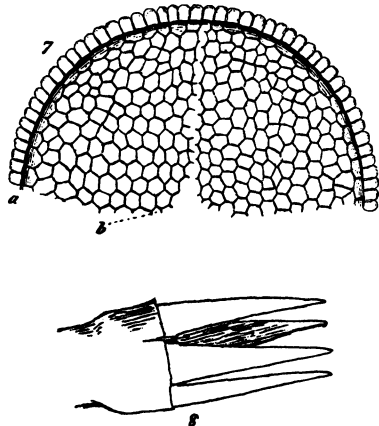


Fig. 1.

In *Georgia* the peristome apparently has no function except to provide an opening for the escape of the spores. In most other forms the peristome is so arranged as to in a manner regulate this escape.

EXPLANATION OF FIGURES.

Fig. 1. 7. Half of a section of the peristome and operculum of *Georgia* (*Tetraphis*): a. Operculum composed of a single layer of cells; b. Tissue which fills the operculum and which splits into four parts to form the peristome. 8. Peristome of *Georgia* x 40.

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SOME FURTHER OBSERVATIONS ON BUXBAUMIA.

BY ELIAS J. DURAND.

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The interest I have felt in the notes on *Buxbaumia* in the last number of THE BRYOLOGIST has prompted me to add some of my own observations on this genus. I shall never forget the pleasure I experienced when, one spring day eleven years ago, Professor Dudley first pointed out to me some of these little plants growing on a shady bank close by the campus. Ever since that time when in favorable localities, I have kept my eyes open for these little "elves."

The open woods bordering the ravines about Ithaca furnish most congenial habitats for *B. aphylla*. On the banks of any one of a half-dozen of our larger gorges, I can be sure of finding at least a few of the capsules in suitable spots. By Coy Glen I have found it every few rods for a distance of nearly two miles on both banks. Near one stump I can collect hundreds of specimens in their season. It is a spot which I always visit with my classes. Were I not afraid of bringing smiles of incredulity to the faces of your readers, I should tell how I once dug down at random through a foot of snow by the side of an old wood road, and found capsules in the first hole dug! This does not mean that the plants are scattered uniformly over the whole surface, but long practice gives one a sort of instinctive facility in knowing just where to look.

The habitat of this species is with us very characteristic. The plant always grows in open woods, on soil which has a damp blackish appearance, with a tinge of green due to the persistent protonema. Such spots often have a sparse growth of other mosses and lichens, but show no more traces of rotten wood than other woodland soil. I have never found *B. aphylla* on wood or logs. Neither have I been able to establish any uniformity in the direction of the capsules on level ground. On sloping banks, however, they always stand with their ventral sides down the hill, as Haberlandt long since pointed out.

The young sporophytes begin to appear early in September, when they are entirely covered by the thimble-shaped calyptras. The latter are ruptured by the elongation of the sporogonia exactly as in the other Bryineae. Growth is rather rapid until the last of October or the first of November, when the majority of the capsules are about one-half or two-thirds grown. Occasionally development is much later than these periods. During the cold months of winter there is little or no development of the capsules, which remain a bright green,